18. ~~61~~. (New) The method as claimed in claim 15 ~~10~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

25. ~~62~~. (New) The method as claimed in claim 20 ~~13~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

10. ~~63~~. (New) The method as claimed in claim 4 ~~3~~, wherein the plan histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

14. ~~64~~. (New) The method as claimed in claim 11 ~~8~~, wherein the plan histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

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19. ~~65~~. (New) The method as claimed in claim 15 ~~10~~, wherein the plan histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

28. ~~66~~. (New) The equipment as claimed in claim 26 ~~21~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

35. ~~67~~. (New) The equipment as claimed in claim 29 ~~22~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

39. ~~68~~. (New) The equipment as claimed in claim 37 ~~27~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

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43. ~~69~~. (New) The equipment as claimed in claim ~~29~~ 40, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

50. ~~70~~. (New) The equipment as claimed in claim ~~32~~ 45, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

36. ~~71~~. (New) The equipment as claimed in claim ~~22~~ 29, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

31. ~~72~~. (New) The equipment as claimed in claim ~~23~~ 30, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

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44. ~~73~~. (New) The equipment as claimed in claim ~~29~~ 40, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

53. ~~74~~. (New) The computer-readable recording medium as claimed in claim ~~40~~ 51, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

60. ~~75~~. (New) The computer-readable recording medium as claimed in claim ~~41~~ 54, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

63. ~~76~~. (New) The computer-readable recording medium as claimed in claim ~~46~~ 61, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

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68. ~~71~~. (New) The computer-readable recording medium as claimed in claim 65 ~~48~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

75. ~~78~~. (New) The computer-readable recording medium as claimed in claim 70 ~~51~~, wherein the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images.

76. ~~79~~. (New) The computer-readable recording medium as claimed in claim 54 ~~41~~, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

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56. ~~80~~. (New) The computer-readable recording medium as claimed in claim 55 ~~42~~, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

64. ~~81~~. (New) The computer-readable recording medium as claimed in claim 61 ~~46~~, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

69. ~~82~~. (New) The computer-readable recording medium as claimed in claim 65 ~~48~~, wherein the plane histogram is obtained as votes accumulated in a plane parameter space obtained by use of a three-dimensional Hough transform.

REMARKS

New claims 58 to 82 have been added, and therefore claims 1 to 82 are now pending.

Applicants thank the Examiner for considering the references of the Information Disclosure Statement, and respectfully request reconsideration of the present application in view of this response.

Applicants thank the Examiner for allowing claims 8 to 12, 27 to 31 and 46 to 50.

Applicants thank the Examiner for indicating that each of claims 4, 5, 7, 14 to 17, 23, 24, 26, 33 to 36, 42, 43, 45 and 52 to 55 contain allowable subject matter and would be

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allowable if rewritten in independent form including all of the limitations of its respective base claim and any intervening claims. Since, however, it is believed that the base claims are allowable as explained herein, the objections to these claims are respectfully traversed.

With respect to paragraph two (2) of the Office Action, claims 1 to 3, 6, 13, 18 to 22, 25, 32, 37 to 41, 44, 51, 56 and 57 were rejected under 35 U.S.C. § 102(b) as anticipated by the Nelson reference.

The Nelson reference, which is discussed in the specification at page 9, line 11 to page 10, line 7, simply does not in any way identically disclose (or even suggest) all of the recited features of each the rejected claims, as explained below.

The Office Action (on page two (2)) asserts that the Nelson reference "teaches" claims 1 to 3 and 13. It is respectfully submitted, however, that this is simply wrong for the following reasons.

First, the steps (a) to (c) recited in claims 1 to 3 and 13 are not fully common to claims 1 to 3 and 13. In the claims rejected under 35 U.S.C. 102(b), there are basically four groups of independent claims, namely, a group G1 that includes claims 1, 20 and 39, a group G2 that includes claims 2, 21 and 40, a group G3 that includes claims 3, 22 and 41, and a group G4 that includes claims 13, 32 and 51. It is noted that the step (c), discussed below, for "measuring temporal features and spatial features of the image from the motion trajectory which is acquired as the three-dimensional volume data by the step (b)" is only recited in claim 1-- and not in claims 2, 3 or 13. It is therefore respectfully requested that the Examiner note that only the steps (a) and (b) are essentially analogous or common to claims 1 to 3 and 13, and that the remaining steps of claims 1 to 3 and 13 are not analogous or common.

Second, the passages of the Nelson reference relied upon in the Office Action simply do not identically disclose -- as they must for anticipation -- (or even suggest) the steps (a) to (c) of each of the claims 1 to 3 and 13. The Office Action asserts that the Nelson text at page 81, right column, third paragraph to page 82, left column, line 7, "teaches" a step (a) for inputting an image sequence. This passage in Nelson, however, only concerns two approaches to obtaining a shape from motion utilizing different methods for extracting motion information from image sequences. In particular, the cited text refers to what are believed to be difficult methods using point correspondences that rely on matching techniques, and also refers to techniques for computing dense motion fields that rely heavily on differential methods. Accordingly, this passage in Nelson is simply unrelated to and

therefore does not identically disclose (or even suggest) the step (a) recited in any of claims 1 to 3 and 13.

The Office Action also refers to the Nelson text at page 83, left column, line 3 to right column, line 24, as teaching a "step (b)" for acquiring a motion trajectory of an image contour or a target included within a region defined by an arbitrary spatial range and time range within the image sequence input by the step (a), as a three-dimensional volume data drawn within a spatio-temporal space in which each of the frames is time-sequentially stacked. This Nelson passage, however, only refers to the idea that the problem with using optic flow is that it is difficult to compute accurately. Even if the Nelson text at page 83, left column, lines 3 to 5, did suggest that the temporal texture could be analyzed directly as a three-dimensional signal using generalizations of the techniques applied to two-dimensional fields, it is explained in the remainder of this passage that the two-dimensional optic flow fields are accumulated to form the three-dimensional signal. Accordingly, this cited Nelson passage is simply unrelated to and therefore does not identically disclose (or even suggest) the step (b) recited in any of claims 1 to 3 and 13.

The Office Action also relies on the Nelson text at page 83, left column, line 21 to right column line 2, as teaching a "step (c)" for measuring temporal features and spatial features of the image from the motion trajectory which is acquired as the three-dimensional volume data by the step (b). This cited Nelson passage, however, merely refers to the idea that the problem with using optic flow is that it is difficult to compute accurately, as explained above with respect to the step (b). Accordingly, this cited Nelson passage is simply unrelated to and therefore does not identically disclose (or even suggest) the step (b) of any of claims 1 to 3 and 13.

Third, contrary to the unsupported assertions of the Office Action, Nelson does not identically disclose (or even suggest) the further recited features of any of claims 2, 3, 6, 13, 18 and 19 -- as any reading of these claims makes clear. As discussed below, it is also respectfully submitted that Nelson does not in any way identically disclose (or even suggest) the recited features of claims 20 to 22, 25, 32, 37 to 41, 44, 51, 56 and 57, which are directed to the equipment and the computer-readable recording medium.

As regards claim 2, the Office Action (in the paragraph at pages 2 and 3) relies on the Nelson text at page 84, left column, lines 3 to 14 (first passage), as teaching a "step (c)" for acquiring a plane histogram of one of tangent planes tangent to the motion trajectory and

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partial planes which may be included in the motion trajectory, and also in the second Nelson passage at page 84, left column, lines 9 to 14, as teaching a "step (d)" for measuring temporal features and spatial features of the image from the plan histogram which is acquired in step (c). The first passage, however, apparently refers only to the idea that calculation of the histogram related to the normal flow direction is calculated from the flow field. In Nelson, the normal flow is calculated from the optical flow -- and *not* from the motion trajectory. Furthermore, the second passage apparently refers only to the idea of calculating the feature from the histogram. As discussed above, however, the histogram itself is completely different as between Nelson and claim 2, and it is therefore respectfully submitted that the "feature" calculated from the histogram will be completely different as between Nelson and claim 2. Accordingly, these cited Nelson passages are simply unrelated to and therefore do not identically disclose (or even suggest) the steps (c) and (d) of claim 2, which is therefore allowable.

As regards claim 3, the Office Action (on page 3) asserts that the Nelson text at page 83, right column, third paragraph (first passage) teaches a "step (d)" for estimating a velocity component of the target which moves within the region from the plane histogram acquired by the step (c), that the text at page 83, right column, third paragraph, lines 5 to 7 (second passage), teaches a "step (e)" for extracting a distribution of the tangent planes corresponding to the image contour of the target which moves at the velocity component estimated by the step (d), and that the text at page 83, right column, lines 19 to 24 (third passage), teaches a "step (f)" for acquiring spatial features of the image from the distribution of the tangent planes extracted by the step (e).

In this regard, the first passage relied upon, however, only refers to the idea that the average flow magnitude divided by its standard deviation is a useful statistic based on the distribution of the normal flow magnitude, and that the scaling by the standard deviation has the effect of making the measure robust under scaling changes. Accordingly, the normal flow distribution itself is completely different as between that of Nelson and claim 3. The velocity components obtained from such different normal flow distributions are therefore naturally and wholly different as between that of Nelson and claim 3. More particularly, the average flow magnitude apparently referred to in Nelson is the normal flow magnitude (velocity in the normal direction of the contour), but the velocity component of claim 3 is the actual moving velocity of the object (target) in the picture.

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The second passage relied upon does not even mention or refer in any way to distribution of the tangent planes corresponding to the image contour of the target. Accordingly, this second passage is wholly unrelated to and therefore does not identically disclose (or even suggest) this further recited feature of claim 3.

The third passage relied upon only refers to the idea that the most typical structure for a temporal texture features involves extended spatial or temporal (or both) measures of spatio-temporal microfeatures, and that the "features" can also be derived from extended spatial measure of extended temporal features and vice versa. Accordingly, this third passage does not even mention or refer in any way to the recited claim 3 feature of acquiring the spatial features of the image from the distribution of the tangent planes, and is therefore wholly unrelated to and therefore does not identically disclose (or even suggest) this recited feature of claim 3. In this regard, the Office Action may reflect a confusion in the normal flow referred to in Nelson and the tangent planes of claim 3 -- which are completely different.

As regards claim 6, the Office Action (on page 3) asserts that the Nelson text at page 83, right column, second paragraph, teaches a "step (a)" for extracting a distribution of tangent planes along tangent line directions to the image contour of the target, and a "step (f)" for calculating feature values related to a directionality of the image contour of the target from the distribution of the tangent planes extracted by the step (a). This passage, however, merely refers to the idea that the direction and magnitude of the normal flow can be combined locally, both spatially and temporally, to obtain second-order local motion measures. There is simply no mention or even oblique reference whatsoever as to the claim 6 feature of extracting the distribution of the tangent planes along the tangent line directions to the image contour of the target. Since the distribution of the tangent planes is completely different from the normal flow distribution, the passage relied upon is wholly unrelated to and therefore does not identically disclose (or even suggest) the foregoing recited claim 6 features.

As regards claim 13, in the paragraph at pages 3 and 4 of the Office Action, it is asserted that the Nelson text at page 84, left column, lines 3 to 7, teaches a "step (d)" for extracting, as an image, a distribution of the motion trajectory existing on the tangent planes detected by the step (c), and that the text at page 84, left column, lines 9 to14, teaches a "step (e)" for tracking a motion trajectory on the image extracted by the step (d) and detecting an occlusion of the target where tracking is done by normal flow direction method and intensity texture is occlusion of the target. The passages relied upon, however, only refer to the idea of

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a histogram related to the normal flow direction, and therefore do not even mention -- let alone identically disclose -- the feature of the distribution of the motion trajectory existing on the tangent planes. Accordingly, these passages are wholly unrelated to and therefore do not identically disclose (or even suggest) the foregoing recited features of in claim 13, which is therefore allowable.

As regards claim 18, the Office Action (on page 4) asserts that the Nelson text at page 81, left column, fourth paragraph, lines 9 to12, teaches the recited method features in which the three-dimensional volume data is obtained by forming difference images among the frames in time sequence, and stacking the formed difference images. The passage relied upon, however, only refers to the idea that a point in the image at a given point in time is projected to a coordinate that is shifted by a certain amount at a next point in time. Accordingly, the cited passage is wholly unrelated to and therefore does not identically disclose (or even suggest) the foregoing recited features of claim 18. In this regard, the Office Action may not understand "difference images" as used in the context of the claimed subject matter, and as fully explained and supported by the present application.

As regards claim 19, the Office Action (on page 4) asserts that the Nelson text at page 84, left column, lines 3 to14 (first passage), teaches that the plane histogram is obtained as votes accumulated in a plane parameter space, and that the text at page 88, left column, second paragraph, lines 4 to 7 (second passage), teaches that the identity of the texture is obtained by using a three-dimensional Hough transform. The first passage, however, merely concerns the normal flow space -- and *not* a plane parameter space, while the second passage merely concerns a generalized Hough transform and does not even mention or refer in any way to the feature that the plans histogram is obtained as votes accumulated in a plans parameter space obtained by use of a three-dimensional Hough transform. Accordingly, the passages are wholly unrelated to and therefore do not identically disclose (or even suggest) the foregoing recited features of claim 19, which is therefore allowable.

In this regard, because the Office Action erroneously relies on passages in Nelson that are completely unrelated to the subject matter of the rejected claims, the Office Action apparently reflects a confusion, for example, of the term "tangent plane" as recited in the context of the claims and a "normal flow" as referred to in Nelson -- which are completely different. As the present application makes plain, the tangent plane includes information related to the position of the contour and the claimed subject matter therefore involves the

effective use of this nature of the tangent plane. By obtaining the tangent planes that are tangent to the motion trajectory in the spatio-temporal space formed by a plurality of image frames, it is possible to stably extract information from the target even if the appearance, disappearance and occlusion of the target frequently occur. As a result, in terms of the normal flow, a stable normal flow distribution having an extremely high resolution, as compared to the normal flow calculation method referred to in Nelson. That is, the normal flow distribution obtainable using the presently claimed subject matter has characteristics that are completely different from that of Nelson. Accordingly, the techniques used to extract the features from such different normal flow distributions are wholly different as between the presently claimed subject matter and the method of Nelson.

The Office Action also rejects claims 20 to22, 25, 32, 37 to 41, 44, 51, 56 and 57, which are directed to the equipment and computer-readable recording medium for apparently the same reasons as claims 1 to 3, 6, 13, 18 and 19. Accordingly, for essentially the same reasons discussed above with respect to claims 1 to 3, 6, 13, 18 and 19, it is believed and respectfully submitted that claims 20 to 22, 25, 32, 37 to 41, 44, 51, 56 and 57 are simply not identically disclosed (or even suggested) by Nelson.

It is therefore respectfully submitted that claims 1 to 3, 6, 13, 18 to 22, 25, 32, 37 to 41, 44, 51, 56 and 57 are allowable as presented.

As discussed above and for the reasons described above, it is believed that claims 4, 5, 7, 14 to 17, 23, 24, 26, 33 to 36, 42, 43, 45 and 52 to 55, which were objected to, are allowable as presented since they depend from base claims that are plainly allowable over the references relied upon, as discussed above.

New claims 58 to 82 have been added for consideration, and are fully supported by the original disclosure and contain no new matter. The new claims 58 to 82 are being added because the multiple dependency of the original claims was eliminated by the prior Preliminary Amendment.

The new claims 58 to 62 correspond to claim 18 but respectively depend upon claims 2, 3, 8, 10 and 13, and are therefore allowable for the same reasons as their respective base claims.

The new claims 63 to 65 correspond to claim 19, but respectively depend upon claims 3, 8 and 10, and are therefore allowable for the same reasons as their respective base claims.

The new claims 66 to 70 correspond to claim 37, but respectively depend upon claims